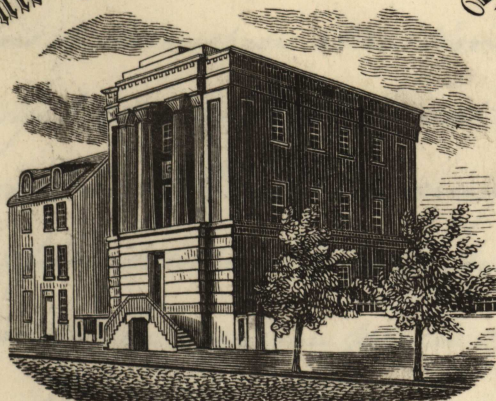


The Healing of Wounds, a Process of Nutrition

RESPECTFULLY SUBMITTED TO THE FACULTY

of the

Homoeopathic Medical College of Pennsylvania.



FOR

The Degree of Doctor of Medicine

BY

Pusey Wilson, of Hockessin, Delaware

Philadelphia, Feby. 1st 1862

In obtaining a correct knowledge of any scientific subject, the essential starting point, is a clear understanding of terms used in its description, a correct appreciation of its intrinsic elements and the phenomena by which it is accompanied, even to the most minute of its necessary constituents. Each of its various departments, may present to different minds, features, of various degrees of interest or attraction, or of apparent importance, yet each and all, must recognise the indispensable existence of each and every part to the completeness of the whole. A number of persons examining one of the master pieces of some great artist, will all be conscious of the general effect or scope of the painting, while each may see and admire a different part or character therein, and the impression upon each will depend very much, upon the extent of the knowledge he may bring to bear in his examination. To the unskilled the most prominent parts will give character to

The piece, while the educated and skilful critic will analyze it, and become cognizant of new beauties, and estimate at their true value each delicate wavy line and exquisite blending of colors, the finest touches of a master hand. While all acknowledge its beauty full, to him, it presents the very essence of that beauty, and gives him higher and clearer conceptions, of the glory, the grandeur and the capabilities of his art. So it is in the investigation of any subject; our views are modified by the amount of knowledge we possess, and just so far as we are prepared to go down into the very gist of the matter, are we able to form an intelligent opinion; but that opinion is often varied as much by the stand-point from which we view the subject, as by any difference in ability to comprehend its details; but above all are we too much inclined to depend upon the judgement of those who have gone before

us in their investigations, of looking for precedents, instead of relying upon the evidences of our senses, and the use of our own reason upon the facts presented.

In the consideration of the process of healing, in wounds, this disposition has been most strikingly manifested. The earlier writers not possessing the knowledge of Physiology now attainable, knowing literally nothing of the Physiology of Nutrition, or the phenomena attending its healthy performance, were unable to distinguish between it and a higher grade of vascular excitement, designated both by the name of inflammation, which they regarded as a disease, although at times, and in certain grades a disease necessary for the restoration of health.

Strange as it may seem this impression is still kept up even by the latest and best authors upon this subject, exhibiting the

inexplicable anomaly, of making diseased action,
necessary ~~for~~ ^{to} healthy repair or nutrition.

Inflammation has by following the lead of the
earlier authors upon this subject, ~~been divided~~
with their erroneous notions— ~~been divided~~ into
healthy and unhealthy, and to one assigned
the office of repair in injuries, the union of
fractures, healing of wounds and the reproduc-
tion of lost material; to the other effusion,
suppuration, ulceration, gangrene &c &c,
ranging under one general name, all the
phenomena of the most healthy nutrition,
and the most rapidly destructive diseased
actions, thus confounding the student and
creating false impressions in regard to
both nutrition and inflammation, rendering
necessary various fine drawn and puzzling
distinctions, confusing a nomenclature
which should be clear and simple

Dr L.D. Gross one of the latest and best writers upon surgery makes use of the following language in reference to this subject "The little ^{wound} made in resection, the incision left in cupping and the bites inflicted in leeching, would never heal without the aid of this process; the parts would remain open, and be the seat of incessant bleeding, or they would ^{become} fistulous and putrid sores. In a word there would be no reparation after injuries of any kind, however simple; and operative surgery instead of bearing healing on its wings and being a blessing to our race would be the most blood-hooded butchery. Thus it will be perceived that inflammation is capable of playing, as it were, a double game in the animal economy, being at one time a cause of death, at another a source of life" immediately following with a clear concise and truthful definition of the same to wit "Inflammation may be defined to be a purulent

action of the capillary vessels of a part, attended with discoloration, pain, heat, swelling and disordered function, with a tendency to effusion, deposits or new products. In addition to these changes, there is also an altered condition of the blood and nervous fluid, as an important element of the morbid process". Now adopting this as a concise definition, let us examine the phenomena which attend this "perverted action of the capillary vessels" which seems to be such an important part of this "morbid process". If heat or cold, escharotics or stimulants or any morbid or disease producing substance, be applied to a tissue the immediate effect is a contraction of the capillary vessels, ~~these vessels~~, as though they would shut out the damaging substance, but relaxation soon follows, and dilatation sets in rapidly, inviting a rapid flow of the circulating fluid, increasing the dilatation, producing elongation and tortuosity

untill they become merely passive elongated
tortuous and dilated tubes, into which pour
thick and fast the red corpuscles, causing dis-
coloration, with complete stagnation of the cir-
culation. This increased flow of blood to the part
raises ~~the~~ temperature, nearer the degree exist-
ing at the central organ of circulation, which
is still further increased by the more rapid chem-
ical changes going on therein, which changes
often raise it even higher than that of the
natural condition of the heart. The swelling
depends upon the increased size of the vessels and
upon the effusion, through their distended
walls, of the materials of the blood, into ~~the~~
the surrounding tissue. This swelling pressing
upon the nerves, rendered sensitive by their inflamed
condition, is sufficient to account for the pain
attendant upon this disease, and also for the
increased sensibility of the tissues to pressure

motion, or the legitimate performance of its natural functions. We must now add to the signs already considered, that of "disordered function" which is occasioned by the overpowering of the vital forces, by the great influx of blood, with the impaired condition of the nerve communication of the brain with the part, ^{by} the inflamed state of the nerves themselves. As all the functions of the organism are either mediately or immediately under the control or supervision of the brain, we can readily see, that "disordered function" must follow any interference with the integrity of the channels of communication between it and the rest of the body. The distention of the capillaries by thinning their coats naturally invites a great ex-effusion of the elements of the blood into the part inflamed, and thus deposits are made, which under favorable conditions are organized into new material or degenerates

In

into pus, and if the inflammation has been of sufficient intensity, to interfere with the vitality of the part, this degeneration may not only involve the effused substance, but the original textures themselves, leading to ulceration or the complete death and removal of the part. Now when we consider the changed condition of the blood, and a serous fluid which ~~is~~ "an important element of the morbid process" I think we will have a pretty clear idea of the disease in question and of the justness of the definition used, and I cannot see how any one can avoid being confounded by the incongruities presented by writers upon this subject.

Having examined thus hastily the phenomena attending inflammation, ~~proposing the definition used~~, let us consider the process of nutrition and see if we cannot secure all the beneficial results usually

ascribed to inflammation, without invoking
its aid. The thorough examination of the
nutrition of the body involves the consideration
of so many of the organs of which it is com-
posed, and their functions, as to forbid the
attempt, to trace through all its changes,
the nutritive material, from the food
taken into the mouth, to its complete
elimination and vitalization, by the various
secretions to whose action it is subjected, and
the glands through which it passes, to
the point where it enters the circulation,
through the thoracic duct, and is carried
by it to its destination the individual
tissues of which the body is composed.

Suffice it for our present purpose to say
that that elimination and vitalization is
accomplished and that it mixes with
the vital current as above designated.

We will take up this investigation at the point, where the nutrient material enters and becomes a part of the blood, and must from thence be traced in connexion with that fluid. After being carried through the Vena cava superior to the heart it is driven through the lungs in company with the venous blood of the general circulation for further purification and vitalization, is returned to the heart and ~~is~~ conveyed by the arteries to the capillary vessels of the various tissues, entering into the formation of the organism.

To understand fully the process of nutrition we must hastily examine the anatomical construction of these vessels as through them is this important function performed. The arteries are flexible and elastic tubes, composed of a delicate internal membrane

possessing the nicest possible adaptation to the facile movement of the blood, surrounded and strengthened by ~~an~~ elastic and fibrous coats giving solidity and strength, while the capillary vessels, we find to be exceedingly minute, indeed microscopic tubes, ramifying in inconceivable numbers through the tissues, supplied ~~only~~ with this delicately adapted internal coat, or endothelium, through which by the law of endosmosis or exosmosis, directed by the selective affinity of the life cells, governed by the vital force, all nutritious material is absorbed by or given out to the part to be nourished. Now if these vessels conveyed only sufficient nutriment to supply the reproductive material needed to replace the destroyed tissue occasioned by the natural waste or disintegration of the body, we would, in emergencies, find the prompt supply of

it not readily to be commanded, But nature
ever prodigally provident, yet scrupulously
economical, sends into the parts an excess of
their proper pabulum, necessitating an ar-
rangement by which that excess may be saved
and retained for future use. To accomplish
this we have another set of vessels, whose office
work is to absorb all unused material, and
return it to the general circulation, to wit
the Lymphatics

We are now ready to consider the necessary
conditions for the healthy maintenance of
all the structures of the body by nutrition;
these according to most modern writers are

- 1 A right state and composition of the
Blood or other nutritive material
- 2 A regular and not far distant supply
of such blood
- 3 A certain influence of the nervous system

4 A natural state of the part to be maintained

As all nutriment is furnished by the blood we see at once the necessity for this condition.

No standard of absolute definiteness of chemical composition being possible, no well defined relation between the various elements of which it is composed being maintainable, that chemical composition and relation being constantly changing according to the demands of the system, within certain limits compatible with health, a right state of the blood must be that, in which all the elements, necessary for the nutrition of all the parts, exists within this range of health.

The second is equally evident as has been already shown. Although some of the structures, are apparently destitute of blood vessels, in a normal state, there is no doubt their nutrition depends upon

an adequate supply of the proper elements of the blood. But what is "a regular supply of blood" If the arteries retained their normal size, and the ventricles of the heart contracted seventy five times per minute, we should have a very regular supply, but that supply would be inadequate for healthy nutrition after violent exercise, or many other exigencies to which the system is constantly liable, consequently a regular supply must be regarded as one sufficient to maintain or reestablish the healthy nutrition of all the organs, in its integrity.

The third is but little regarded by most surgeons, in estimating the conditions for healing. All the vital operations, taking place in the body, are under the presiding or directing forces of the mind as is sufficiently evidenced by its impressing upon face and form, peculiar characteristics of itself or

at least their outward expression. But off all nerve communication between the nerve centers and the different organs, and atrophy, mortification or death follows, even the ophthalmic branch of the fifth nerve, involving the Gasserian ganglion, and complete disorganization and destruction of the eye is induced; divide the Brachial plexus and the arm withers or perhaps falls from the body, and any material interference with the nerves of a part is almost invariably followed by inflammation and often gangrene.

The fourth needs also a few words of explanation, for a correct understanding of its import. What does the expression "a natural state of the part" mean? Not that it should maintain a certain degree of temperature, either absolutely or as compared with the central organ of circulation, not that it

~~essential~~ Should have a definite chemical composition, an invariable size or shape, a certain fixed degree of sensibility, or an unchanging color, as in all these conditions it is constantly varying, even in the most perfect health. It can mean nothing else than that the vital formative cells, shall retain their ability to assimilate the nutriment necessary for the maintenance or increase of the tissue.

Having arrived at a clear understanding of the conditions necessary for nutrition let us examine that process itself.

It is now believed by the best, most patient and laborious investigators of this department of Physiology, that the ultimate elements of all the tissues are nucleated cells, having the power to reproduce their like by absorbing from the circulation

The proper food for that purpose, and thus replace the waste material of the body and secure growth. and this power is found to exist to a sufficient degree to secure the necessary enlargement of any organ or apparatus, upon which, exercise of its peculiar functions has demanded an increase of power. The extent of the power of cell reproduction can be seen in the rapid development of muscular tissue by their well directed exercise, or in the increase of all the component parts of the body after severe emaciating disease, where not only the tissue has to be reproduced, but the power of reproduction itself gradually developed, - after its long inactivity - by that vital power + ever present in the body which constantly inclines toward health, and disposes it to regain its lost perfection, when invaded by disease, that power upon which the physicians must rely for all

his cure, and to aid which, he is to devote the best efforts of his life. Now the application of the principles, above reviewed, to the repair of injuries will elucidate more fully the power of nutrition and the necessity for the conditions before alluded to. The presence in their entirety of these conditions ensures the reproduction of tissue perfectly homologous with the original, and the ~~also~~ absence of any one changes the cell life to a greater or less extent, and compels an altered reproductive power, by which either a tissue of inferior development is produced, or no formative power is manifested at all.

In subcutaneous wounds, we approach nearer the conditions of healthy nutrition than in any others, and have less inflammatory action yet here we have also the most rapid and perfect repair. extensive wounds of this kind are readily healed without an apparent

effort, on the part of the system, and attended by no untoward symptoms. The division of tendons, fractures of bone, section of muscles, in such a manner as to exclude the irritating influence of the air, heal easily, with but little expenditure of vital force, and without any formation of investing callus or other provisional material, afterward to be removed by absorption, if nice coaptation with complete rest are secured. In all these cases the least inflammatory action interferes to arrest or prevent healing, and wherever we find a constitutional tendency in that direction, we also meet with the greatest difficulties in securing union.

In open wounds also the various processes of healing, are most perfect, both as to rapidity, and the state of development of the tissue through the medium of which repair or union is accomplished, in which the ~~least~~ signs of

inflammation are most decidedly absent. Of all the modes of healing that by "immediate union" is most desirable, next by "scabbing" on account of its approach to subcutaneous repair, both of which are admitted to be without inflammatory action. Next by what has been called "Adhesive Inflammation", but which is really accomplished by the deposition of plastic Lymph to be organized and developed by the vital force of Nutrition, and so clearly independent of inflammation, as to be invariably impeded by its superintention.

In those cases where granulation becomes necessary, the distinction between healthy repair and that by inflammation is equally well marked, and the consequences of inflammation no less disastrous. In healthy repair, the process partakes much of the true nature of growth, and under favorable circumstances, they are

almost or quite identical. In examining this process in the inferior animals, in which inflammatory action is rarely found, ~~and~~ meet with the most perfect reproduction of parts, and this gradually decreases as we rise toward man the most subject to this disease, and among men those most healthy and least irritable are found to replace lost tissue and heal by granulations of a much more highly developed material. When extreme care is taken to secure the most favorable conditions for healing, as complete rest, a proper temperature and the application of collodion or some similar substance to exclude atmospheric irritation, by performing the office of an artificial skin or by the use of Callendula, which seems to possess the power of completely controlling inflammatory action ~~by~~ and aiding the development of normal tissue, we are able, not only to

effect union much more rapidly, but by a tissue of a much higher degree of vitalization, and less liable to attacks of subsequent inflammation. Still further, when we consider the intimate nature of nutrition, the power of reproduction from organic life cells, sufficient not only to maintain, but increase the tissues of the body; and remember that on the healthy state of the part depends the facility of such reproduction we can easily believe, that the necessary conditions for healing are best secured by the absence of all inflammatory action.

What is inflammation? The definition has been already given. Let us look at some of its results in wounds. The very first is to increase the fibrin of the blood and consequently favor the formation of tissues to which that is the appropriate pabulum, this

being the fibro-gelatinous, we find the cicatrix resulting from its action, to be of this character, or the connective, but even this unhealthy and constantly liable to future disease and by its inherent power of reproducing its like frequently running into fibrous tumors or fibrous formations of various kinds.

We would naturally suppose if inflammation was ever essential to healing it would be in wounds of those tissues which are composed of its peculiar formation, to wit, the connective, but even here repeated experiments have demonstrated its entire inutility, and made its disastrous and often destructive effects. Not only is this formation of an abnormal character but the constant tendency of the disease is to break down this formation and also invade surrounding structures, by its presence interfering

with the normal process of nutrition and causing an increased expenditure of vital force for its removal, often leading to loss of life. Can it be possible that a disease, fraught with such fearful consequences can ever be necessary as a healing agent, even in its mildest forms.

Recognizing the truthfulness of the above propositions what vast advantages the knowledge of specific medicine, and the superior means for controlling this disease possessed by the well trained Homoeopathic physician. present in the hitherto much neglected field of conservative surgery. In no sphere of medical art, will the superiority of that practice, and the law upon which it is founded, be more strikingly displayed than here, our system being emphatically calculated to promote

Healthy vital action without waste or any unnecessary expenditure of life force, producing all necessary changes in disease without burthening ^{the} with the labor of eliminating the curative medicinal effect of crude drugs by a process of vital dynamization or oppressing it by the poisonous action of massie drugs

By the new adaptation of means to ends taught by the immutable law of our practice the domain of surgery opens to our view divested of all its honors and many of its long secured incongruities in theory and practice And as attention is more scrupulously and earnestly directed to this subject with an honest purpose of searching out its true relations and the remedies able to correct its diseased tendencies and secure

The most favorable circumstances
for the exercise of the healing process by
the normal action of the life force, will
our art rise in the estimation of the com-
munity and recommend itself to the
judgement of enlightened minds

Having thrown together, amid the
bustle and hard study of such multifarious
subjects as are incident to the life of
the student, particularly of medicine,
the crude and undigested thoughts, I res-
pectfully submit the following propositions

That the healing of wounds is most
normally and speedily accomplished by
the pure process of nutrition

That inflammation is never useful
but always hurtful and retarding to
that process

That the recognition of this fact

will materially aid the surgeon in securing the most satisfactory results in their treatment

That the Homoeopathic treatment of wounds promises much more certain curative results than that of any other school of medicine

That the art of surgery demands more attention from Homoeopathic physicians than it has heretofore received